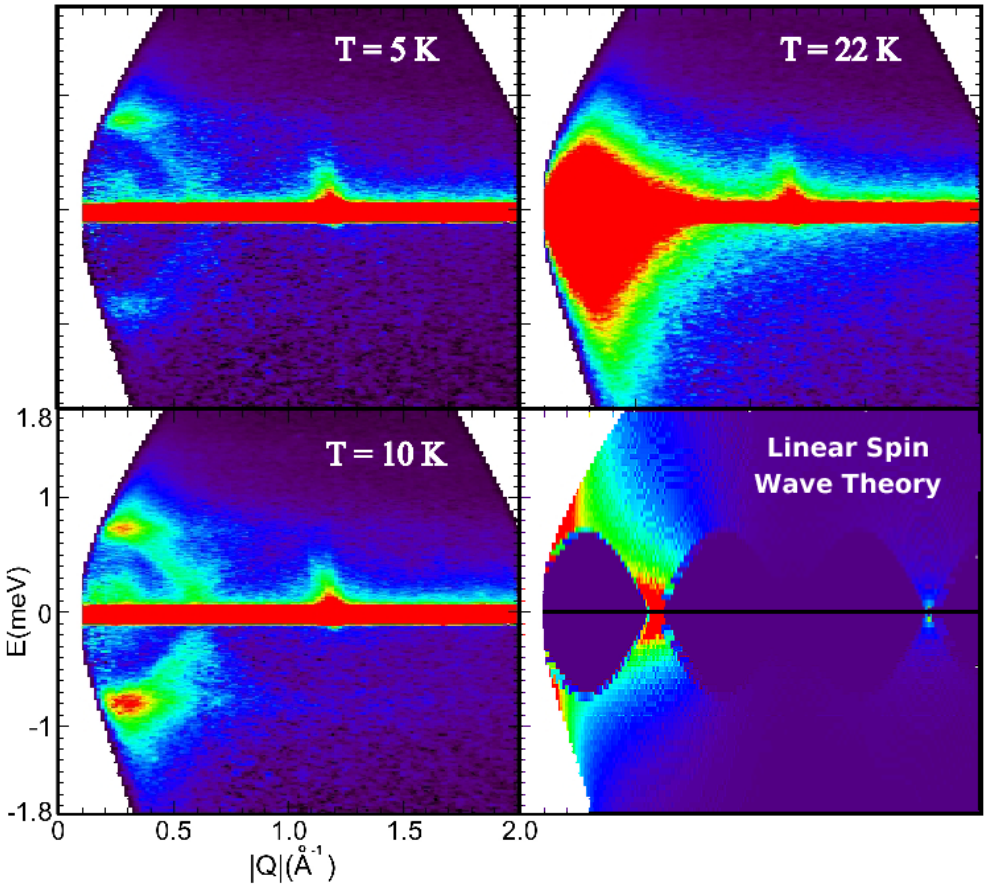
20-year Puzzle in Quantum Magnetism Solved!

M.J. Lewis[1], B.D. Gaulin[1,2], L. Filion[1], C. Kallin[1,2], A.J. Berlinsky[1,2], H.A. Dabkowska[1], Y. Qiu[3] and J.R.D. Copley[3]
[1]McMaster University, [2]Canadian Inst. For Adv. Res., [3]NIST/CHRNS - DMR-0086210

Failed attempts over 20 years to detect ordering of the magnetic Ni^{3+} ions in $LiNiO_2$ led to speculation about an exotic quantum ground state in this potential battery material. Recent measurements using the CHRNS Disk Chopper Spectrometer (DCS) on isostructural $NaNiO_2$ revealed a simple antiferromagnetic structure and conventional spin waves. In $LiNiO_2$, 1 % to 3 % of Li^+ ions are found on Ni^{3+} sites, due to their similar size, in even the best prepared sample. This does not occur for the larger Na^+ ions in $NaNiO_2$. The presence of "impurity" Ni ions on the Li sublattice within $LiNiO_2$ apparently frustrates antiferromagnetic order; a novel, if less exotic, example of frustrated magnetism.



Wave vector (Q) and energy dependence of the neutron scattering from $NaNiO_2$ at 3 temperatures below $T_N \approx 22$ K.

M.J. Lewis, *et al.* "Ordering and spin waves in $NaNiO_2$: A stacked quantum ferromagnet" Phys. Rev. Lett., submitted.

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